Optical Serial Interface

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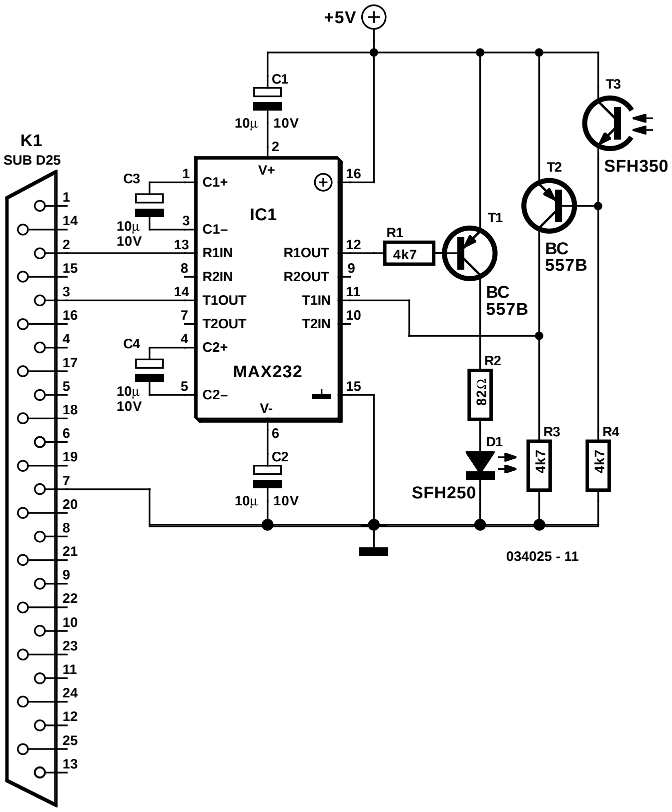

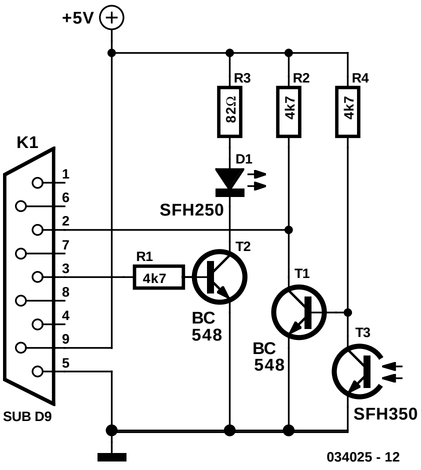

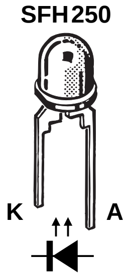

It is sometimes necessary to install microcontrollers quite far away from data processing systems, such as in temperature measurement systems, security systems and other situations. An interference-free connection between the two parts of the system is thus an absolute ‘must’. This simple optical interface is excellent for this sort of application.

The system consists of two parts: a transceiver (**Figure 1**) using a MAX323, which is connected to the serial bus of a PC, and an even simpler transceiver (**Figure 2**) at the microcontroller end. Both circuits can easily be built so small that they can be fitted into the shell of a Sub-D25 or Sub-D9 connector, respectively. The link between the two optical modules is provided by two standard optical cables. The author had no difficulty bridging distances of up to 25 metres using this optical interface.

It will probably be relatively easy to power the circuit shown in Figure 2 from the microcontroller power supply. In many cases, the required 5-V voltage will already be present on pin 9 of the 9-way Sub-D connector. For the circuit in Figure 1, it may be possible to take the supply voltage from the PC with a bit of fiddling. If this proves not to be possible, a simple external supply with a 5-V regulator can be used.

Now for a few practical remarks. First, almost all types of optical transmitters and receivers can be used in place of the SFH250 and SFH350 devices shown here, including the popular TOTX173 and TORX173. A 9-way Sub-D connector can naturally also be used instead of a 25-way connector for connecting the circuit of Figure 1 to the PC, but in this case, it will not be possible to fit the circuit into the connector shell.

If you want to build the circuit so it can be connected directly to the PC, as with the author’s prototype, you will have to use a female connector. Note that the wiring of the Rx and Tx leads (pins 2 and 3) is not always the same; there may be differences between 9-way and 25-way connectors and between male and female connectors. The only solution is to measure everything using a multimeter. The pin bearing a voltage of –10 to –12 V in the quiescent state is the Tx connection of the PC.

The same problem also arises with interconnecting cables. There are extension cables with a male connector at one end and a female connector at the other end, which are connected 1:1, but there are also null-modem cables with two female connectors, which usually (!) have pins 2 and 3 cross-connected. Here again, the answer is to check everything with a meter.

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